Mechanisms and Impacts of Violent Peers at School*

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Abstract

This paper examines the impact of classroom exposure to peers with a history of violent behavior on academic achievement and the underlying mechanisms. We exploit idiosyncratic treatment variations during the primary to middle school transition for causal identification. We find that a higher proportion of violent peers negatively affects cognitive performance in tests in various subjects. These effects are particularly pronounced in mathematics and English, compared to Hebrew and science, with a larger effect on girls than boys. Furthermore, while boys' performance is negatively influenced only by the presence of violent male peers, girls are adversely affected by both violent male and female peers. An examination of the underlying mechanisms reveals that violent peers are related to disruptive learning environments and lower teachers' productivity, reflected in lower job satisfaction and perception of higher workloads. These mechanisms are more pronounced among girls who associate peer violence with more classroom violence and negative relationships between students and between students and teachers. We also find that violent peers induce more violence among girls, significantly increasing the likelihood of them engaging in physical fights during middle school. We document channels through changes in students' behavior, such as involvement in violence and reduction in homework time, especially among girls and students from low SES. We find no effect on parental investment, such as providing private child tutorial sessions at home.

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1. Introduction

The consequences of school violence can be far far-reaching, including psychological distress (anxiety, depression, and trauma symptoms) and long-term health issues, including mental health, substance abuse, and suicidal ideation.[1] School violence is also often linked to lower academic achievement and higher dropout rates.[2] Despite these alarming consequences, surveys indicate that a violent school climate is widespread globally.[3]

This paper investigates the impact of violent classroom peers on academic achievement. The classroom spillover effect of violent behavior, through the "bad apple" principle, highlights the detrimental effects of a violent school climate. When a student disrupts the class and demands excessive attention from teachers, it not only impedes their learning but also disrupts the learning of their peers (Lazear, 2001). The first part of the paper examines how the presence of peers with a violent record affects students' academic outcomes, specifically test scores in various subjects. The second part delves into the relevant potential mechanisms. We explore several intra-classroom factors, including disruptions, student interactions, and relationships between students and teachers. While Lazear's (2001) model assumes a fixed probability of misbehavior, we acknowledge that the negative externalities of violence may arise from changes in this probability, such as shifts in students' self-discipline and study efforts. We investigate these dynamics by comparing students' perceptions of their classroom environment with their self-reported behaviors.

Peer effects have long been a focal point for economists aiming to understand how group behavior and characteristics influence individual outcomes, both empirically (e.g., Coleman (1968); Summers and Wolfe (1977)) and theoretically (e.g., Becker 1974). Despite the intuitive appeal of this concept, estimating peer effects presents significant challenges. As Manski

[1] Turanovic and Siennick. The Causes and Consequences of School Violence: A Review. U.S. Department of Justice Office of Justice Programs National Institute of Justice, 2022.

[2] For example, the 2015 National Youth Risk Behavior Survey found that American students with lower academic grades are more likely than their high-performing peers to be involved in physical fights or to skip school due to an unsafe environment (CDC, 2015).

[3] For instance, the latest PISA 2022 report by the OECD reveals that approximately 20 percent of students hear threats of violence, witness fights in school resulting in injuries, or are frequently bullied.3 The 2018 Teaching and Learning International Survey also found that 14 percent of principals reported frequent intimidation or bullying among their students (OECD, 2018).

(1993) identifies, the simultaneous observation of individual and group behavior makes it difficult to separate the effects of the group from those of the individual. To address this "reflection problem," Manski suggests using pre-group formation data on individuals to analyze their outcomes after they join the group. We follow this approach and use primary school as the pre-group, where we observe each student's violence record, and middle school as the group they join, analyzing their outcomes.

Specifically, we leverage self-reports of students in primary school surveys of the extent to which they were involved in violence. Since it is plausible that middle school classmates are former primary school peers, previous endogenous interactions can threaten the causal identification of the effect of violent peers in middle school. To overcome this concern, we adopt the approach of Lavy et al. (2012b) by constructing separate measures of violence for 'new' and 'old' peers. A student's 'new' middle school peers do not attend the same primary school as 'old' peers. Therefore, new violent peers serve as an exogenous source of potential exposure to violence, thereby minimizing biases related to endogenous sorting, student selection, and other omitted variable biases.

However, the proportion of new violent peers shows a high correlation with students' background characteristics in the sample of this study. To address this selection problem, the identification strategy of this paper relies on idiosyncratic variations in the proportion of new violent classmates between primary and middle school for students who follow the same transition path. This approach facilitates netting our unobserved factors correlated with the proportion of new violent classmates that might affect students' academic achievements on the same transition path. The methodology accounts for confounding factors such as school resources, the composition of the student body (e.g., the proportion of pupils from disadvantaged backgrounds), and the quality of primary schooling. To support the validity of this identification strategy, we present balancing tests that demonstrate that the variation in the proportion of new violent peers within transition paths is unrelated to students' background characteristics. Furthermore, we demonstrate that this variation does not affect a student's likelihood of moving to a different class within the same school or transferring to another school.

Numerous empirical studies have examined the impact of disruptive peers, but this paper offers a more nuanced analysis by focusing specifically on peers with a history of violent behavior. This approach enables a more precise interpretation of their effects. The results show that a higher proportion of new violent peers significantly and negatively impacts the academic performance of other students. These effects are particularly pronounced in mathematics and English, compared to Hebrew and science. Additionally, the analysis reveals that these effects are consistent across students' socio-economic backgrounds, but significant gender differences are evident. Specifically, girls are more adversely affected by the presence of new violent peers than boys. Furthermore, while boys' performance is negatively influenced only by the presence of violent male peers, girls are adversely affected by both violent male and female peers.

We provide evidence that these results are not driven by sample selection biases related to available information on students' prior violence during primary school nor by tracking policies. Moreover, a placebo analysis confirms that the estimates accurately capture the effect of violent peers in the classroom rather than reflecting unobserved factors shared by students within the same middle school or transition cohort.

An examination of the underlying mechanisms reveals that violent peers are related to disruptive learning environments and lower teachers' productivity, reflected in lower job satisfaction and perception of higher workloads. These mechanisms are more pronounced among girls who associate peer violence with more classroom violence and negative relationships between students and between students and teachers. We also find that violent peers induce more violence among girls, significantly increasing the likelihood of them engaging in physical fights during middle school.

In contrast, the analysis reveals a more pronounced effect for girls. While the effect on the average outcome of self-behavior is statistically insignificant, the effect on the dummy variable for involvement in violence is positive and statistically significant (0.187, standard error = 0.073). To put this into perspective, roughly doubling the average proportion of violent peers results in an increase of approximately two percentage points in the likelihood of a girl engaging in violent behavior, implying a 60 percent increase. These findings suggest that, for

girls, exposure to violent peers also causes behavioral changes that further exacerbate the negative impact on academic outcomes. We find no such effect on boys.

Finally, violent peers also affect student and family human capital investments, which we measure by students' weekly homework time and the extent of private tutoring sessions. Two interesting findings should be highlighted. First, exposure to violent peers significantly reduces girls' overall homework time, particularly in math, suggesting that the higher sensitivity of girls to classroom conditions manifests itself also in decreased study efforts. We note, however, that although these effects are statistically significant, they are of small magnitude. Second, the effect on students from low SES families is negative, while on students from high SES families, it is positive. MORE

The paper contributes to three main strands of the literature. First, our study contributes to the economics of education literature, particularly the peer effect perspective. Building on pre-group formation data on individuals, Hanushek et al. (2003), Duflo et al. (2011), Lavy et al. (2012b), and Sojourner (2013) utilize lagged performance to estimate ability peer effects in schools. In addition, Angrist and Lang (2004), Ammermueller and Pischke (2009), Gould et al. (2009), Bifulco et al. (2011), Lavy and Schlosser (2011), Lavy et al. (2012a), Anelli and Peri (2019), and Brenøe and Zölitz (2020) investigate peer effects based on preexisting personal traits. Our study focuses on the peer effect of violent classmates, being the first to use pre-group formation data of violent records of students.

Secondly, we contribute to the literature on the cost of violence and disruptive learning environments. Carrell and Hoekstra (2010) and Carrell et al. (2018) explore both the immediate and long-term impacts of classmates from troubled families on learning. Kristoffersen et al. (2015) examine peers who are potentially disruptive or emotionally sensitive, while Aizer (2008) focuses on peers diagnosed with attention deficit disorder (ADD). Figlio (2007) uniquely investigates peers with documented violent behavior, revealing significant negative externalities, though with limitations in the instrumental variable identification strategy. Our study contributes to this literature by providing a more nuanced understanding of violent peer effects through the use of exogenous exposure to peers with a history of violent behavior. It is the first study that highlights the various mechanisms that derive the effect of violent

peers, distinguishing between the impact on classroom learning environment, students' effort, family investments, and teachers-related effectiveness factors.

The paper is structured as follows. Section 2 reviews the literature on peer effects and the impact of violence on academic outcomes. Section 3 provides an overview of the Israeli school system. Section 4 describes the data construction of the analysis samples and provides descriptive statistics. Section 5 outlines the identification strategies employed in this study and evaluates their validity. Section 6 presents the main estimates of violent peer effects on academic achievement and discusses robustness and heterogeneity analyses. Section 7 explores the potential mechanisms underlying the observed effects of violence. Finally, Section 8 concludes.

2. Context: The Israeli School System

In Israel, students attend their local primary school and remain in the same class from 1st to 6th grade. After completing primary school, they move on to either a local middle school (grades 7-9) or a high school (grades 7-12). By law, primary school graduates must attend grades 7-9 at a school that serves multiple neighborhoods within their residential zone. This policy aims to integrate students from different schools, ethnic groups, and socio-economic backgrounds. As part of this strictly enforced regulation, schools are prohibited from assigning students to homeroom classes based on individual characteristics like family background or academic ability (Zussman et al., 2024).

Nevertheless, parents may have some discretion in assigning their children to different homeroom classes within the same grade. In Section 5, we address this potential issue by conducting balancing tests, which show that the background characteristics of students transitioning from primary to middle school are uncorrelated with the proportion of new violent peers in their middle school classes. Additionally, we demonstrate that mobility patterns within the same transition path are not correlated with the levels of exposure to new violent classmates.

English and mathematics are key subjects in the Israeli education system, as high levels of proficiency in these subjects are essential for obtaining a reputable matriculation certificate

(Bagrut in Hebrew) upon high school graduation. This certificate is a prerequisite for university admission, making exemplary performance in these disciplines during middle school a significant determinant of a student's future academic trajectory and economic prospects. Reflecting the importance of these subjects, since 1994, the Ministry of Education has allowed schools to group students from different homerooms based on their proficiency in mathematics and English. This ability-based grouping enables students to learn these subjects alongside peers outside their assigned homerooms. While schools that implement ability-based tracking must provide opportunities for students to transition between class levels, the regulations do not specify the methodologies for such tracking, nor are schools required to disclose the composition of each ability group (Glickman and Lipshtat, 2013).

In the sample we used to estimate the main results in this study (described in Section 4), approximately 83 percent of schools implement English ability-based classes, and 85 percent group students according to their mathematics achievements. However, the implementation of these policies varies across schools. Some schools teach mathematics and English exclusively in ability groups, while others use a hybrid approach, offering primarily homeroom-based instruction but with additional hours in ability-based groups. Despite these figures, the available data is imprecise and does not allow identification of the specific tracking policy in each school. It does not provide details on the composition of students within each ability group. To mitigate potential biases from these varying tracking practices, in Section 5, we estimate the effect of exposure to violence on students' average performance across multiple subjects, considering both homeroom and ability-based classes. We also provide evidence demonstrating that these tracking policies do not bias the results.

Moreover, the Israeli public education system is divided into two distinct sectors: the Jewish system and the Arab system, each with separate schools and curricula. In Jewish schools, instruction is conducted in Hebrew, while Arabic is used in Arab schools. There are also significant differences in violence levels between Jewish and Arab communities, with violence being notably higher in Arab communities.[4] To focus on a homogeneous school curriculum and account for these differing levels of violence, our analysis focuses on the Jewish sector.

[4] For instance, the number of murders per 100,000 capita among Arabs has been approximately two to three times higher than among Jews during the 1980s and 1990s. Since then, this gap has expanded, with the ratio peaking at approximately eleven times higher in the early 2020s (Elmo-Capital and Hershkovitz, 2023).

Within the Jewish system are secular and religious schools, with the latter offering an intensive curriculum in Jewish studies. Jewish secular schools feature mixed-sex classrooms, whereas most Jewish religious schools are mostly single-sex. For this study, we focus on Jewish secular schools to examine the effects of violence in classes balanced between boys and girls.

3. Data

3.1 Data Construction

This study uses data from the Growth and Effectiveness Measures for Schools (GEMS; Meizav in Hebrew) survey from 2002 to 2005. GEMS, administered by the Division of Evaluation and Measurement of the Israeli Ministry of Education, was a biennial assessment of primary and middle schools. During this period, it covered a representative 1-in-2 sample of schools, with student participation rates exceeding 90 percent for both tests and questionnaires.[5]

The GEMS dataset includes test scores for eighth-grade students in Hebrew, science, mathematics, and English and questionnaire responses from fifth through ninth graders. All students, except those in special education classes, are tested and required to complete the questionnaire. To facilitate interpretation, we converted the original 1-to-100 test scores into z-scores and calculated the z-score of each student's average across the four subjects.[6]

The student questionnaire gathers information on school climate, personal behavior, and time allocated to homework in tested subjects. Students rate their agreement with various statements on a 6-point Likert scale, ranging from 1 (strongly disagree) to 6 (strongly agree). The following statement is particularly relevant to our study: "This year I was involved in many physical fights." To assess prior violent behavior, we linked eighth-grade students' scores and self-reports from 2004 and 2005 with their responses to this statement in primary school (2002-2003, either fifth or sixth grade). We classified as 'violent' students who reported some level of agreement (from "somewhat agree" (4) to "strongly agree" (6)) in primary school.

[5] The GEMS is administered annually to primary and middle schools in half of the localities. In the largest localities, the survey is conducted in half of the primary and middle schools within each city.
[6] The scores were standardized to z-scores within each year and subject.

However, a student can be involved in violence as an aggressor, a victim, or both. A comparable measure for these violent-victim students is discussed in the medical literature bullying behavior. Specifically, students are classified into three categories: pure bullies, victims, and bully victims (individuals who engage in bullying but are also victimized by others). The rate of violent victims in this study is comparable to the prevalence of bully victims found in the medical literature (e.g., Forero et al. (1999) and Nansel et al. (2001)). Furthermore, Juvonen et al. (2003) demonstrate that bully victims tend to experience more significant behavioral and relational problems than bullies that are not victims.

Our data allows us to distinguish between bullying behavior and bullying victims. To this end, we use a questionnaire item where students are asked to relate to the following statement: "Sometimes I am scared to go to school because there are violent students." Agreement with this statement may indicate that the student is a victim of violence. Notably, 33 percent of students identified as violent in the sample of this study reported some level of agreement with this statement. Assuming that violent victims in our sample are somewhat equivalent to bully victims in the medical literature, we define an alternative measure of the number of violent peers. Presenting our detailed results in a later sub-section, we note here that we find contradictory evidence. Our results indicate that exposure to violent peers, both pure violent and violent-victim peers, negatively affects academic scores, and these effects do not differ significantly.

Sample Selection: Out of 90,066 students, linking primary school responses is impossible for about 21 percent of eighth graders, likely due to the biennial nature of GEMS or potential selective exclusion by some schools. This missing data may not be random if certain primary schools selectively opted out or if some students were instructed to avoid school attendance during survey administration. To address this, we focus the main analysis on a sample of classes where at least 85 percent of students have primary school information. This subset includes 41 percent of eighth graders in Jewish secular schools who participated in GEMS in 2004 or 2005. Due to constraints in measuring new exposure to violence within classes, we also limit the sample to schools with multiple eighth-grade classes, reducing the sample size by 12 percent. To account for the background characteristics of the new violent peers, we

further restrict the sample to students with a positive proportion of new violent peers, resulting in a reduction of about 14 percent in sample size.

To construct the proportion of new violent classmates, we first identified each student's i new peers—middle school classmates who did not attend the same primary school as student i. We then identified which of these new peers were classified as violent based on their self-reports in the primary school questionnaire. Note that we can compute this proportion for over 90 percent of the students who are missing their primary information because we can access their primary school peers' data through the administrative records maintained by the Israeli Ministry of Education. To address the issue of incomplete classification of violent behavior, we computed the exposure to new violent classmates as the ratio of new violent classmates to the total number of classmates for whom primary school information is available.

We linked the GEMS data to student administrative records from the Israeli Ministry of Education, which provide demographic information to construct the vector of students' background characteristics.[7] The final sample includes 15,941 students from 524 classes in 172 schools, with responses to GEMS in primary school, allowing for the measurement of their proportion of new violent classmates. These students come from 902 primary schools and constitute 2,026 transition paths from primary to middle school. This sample includes 1,413 students who did not respond to the violence-related statement used for classification. While this missing data does not impact these students' treatment assignments, it affects their peers' assessment.

3.2 Descriptive Statistics

Table 1 reports the descriptive statistics for the sample used in this study. On average, 90 percent of the middle school students in our sample participated during primary school in the Meitzav survey that included questions about their involvement in violent behavior. On average, 76 percent of middle school peers were new; only one of four peers in middle school was also a peer in primary school. The mean in the sample of the proportion of classroom

[7] For students with missing background characteristics, we imputed values using the mean of their classmates' data. These imputed values were then included as control variables in the regression analyses to account for potential bias.

violent peers is 14 percent. Of this rate, 11 percent are new peers, and 3 percent are students' peers in primary school. These rates imply that around 15 percent of a student's new classmates have a prior history of violence.

Five percent of new classmates who had a history of violent behavior in primary school replied "somewhat agreeing" with the statement of being involved in violence during primary school. In comparison, 3 percent "agreed" and 2 percent "strongly agreed" with this statement. Most of these 'violent' peers did not report being afraid to go to school (which we interpret as victims of violence), the rest are 'pure' violent.

There is a significant gender difference in the history of violent behavior, as males account for approximately 73 percent of new violent peers. This notable gender difference motivates our analysis of heterogeneity in the effect of classroom violence by the gender of the victim and the violent peer.

Table A1 in the online appendix reports the mean characteristics of violent and non-violent students. Column 1 presents the means of violent students, and column 2 of non-violent students. Column 3 presents the mean difference and its standard error. The two groups differ statistically. Violent students are more likely to be boys and typically come from lower socio-economic backgrounds: both their parents have fewer years of schooling, and they are more likely to be recent immigrants or of the former Soviet Union and Ethiopian ethnic origin. Additionally, they are also more likely to have been involved in physical violence during middle school. These differences highlight the importance of accounting for the background characteristics of violent peers when assessing the impact of violence on academic achievement.

4. Empirical Strategy

4.1 Identification of Violence Peer Effects

The effects of unobserved correlated factors usually confound the effect of a classroom violent environment on students' outcomes. Such correlations may arise if the violent climate influences the self-selection and sorting of students across schools and classes or if the

presence of (new) violent classmates is associated with other characteristics of the school that impact students' outcomes.

Recent research has employed various identification strategies to address these issues of self-selection and sorting. These strategies include exploiting random group assignments (Duflo et al., 2011; Gould et al., 2011), using instrumental variables (Goux and Maurin, 2007), and leveraging within-school or within-class random variation (Hoxby, 2000; Hanushek et al., 2003; Ammermueller and Pischke, 2009; Gould et al., 2009; Lavy and Schlosser, 2011; Bifulco et al., 2011; Lavy et al., 2012a; Anelli and Peri, 2019; Brenøe and Zölitz, 2020). Additionally, Lavy et al. (2012b) employ within-student variation to refine the analysis of peer effects.

In this study, we rely on variations in the proportion of new violent classmates that result from student's transition from primary to middle school. Based on this framework, we examine whether changes in students' achievement are systematically associated with the variation in the proportion of new violent middle school classmates across primary and middle schools among students who transitioned from the same primary school to the same middle school.

On average, a class comprises students from seven different primary schools, yielding considerable within-class variation. Utilizing within-class variation is advantageous as it allows comparisons among students within the same class while controlling for all class-specific unobserved factors. However, since new violent students constitute only a small fraction of the class, within-class variation has limited statistical power for estimating the effects of violent peers. Conversely, the within-transition-path framework potentially offers more variation, as primary school peers can be assigned to different classes across multiple middle schools.

Hence, we use cross-sectional data with test scores in multiple subjects and estimate the following model:

$$y_{ics} = \alpha_i + \beta^{ES} + \beta^{MS} + \beta_s^{ES-MS} + \gamma X_{ics} + \delta P_{ics} + \varepsilon_{ics} \quad (1)$$

where i denotes students, c denotes class, and s denotes schools. y_{ics} is an achievement measure for an eighth-grade student i in class c and school s. β^{ES} denotes the primary school cohort fixed effect and β^{MS} denotes the middle school fixed effect. β_s^{ES-MS} is a fixed effect for

all students who attended the same primary and the same middle school (same transition path). X_{ics} is a vector of student's characteristics that includes mother's and father's years of education, number of siblings, immigration status, and ethnic origin. P_{ics} represents the proportion of new violent classmates. Finally, ε_{ics} is an error term that accounts for any correlation within observations along the same transition path.

The coefficient of interest is δ, which measures the effect of having a higher proportion of new violent peers on student achievement. Since we estimate the impact of violence on eighth-grade scores one year after class formation, δ represents the "net" effect of exposure to violence, capturing students' adjustment to their new class structure, including interactions with new violent peers.

Moreover, recent research suggests that the effect of the proportion of new violent peers may be confounded by the overall proportion of new peers in the class, which could resemble the effect of exposure to new peers more generally.8 For instance, Golsteyn et al. (2021) find that university students perform better in the presence of persistent peers. Additionally, Lavy and Sand (2019) report that the number of persistent friends moving from primary to middle school significantly affects academic outcomes and the class environment, depending on the quality of these friendships. Therefore, we also include the proportion of new classmates in our preferred model specification.

In addition, drawing on well-established empirical evidence on peer effects, we recognize that the impact of violent peers encompasses not only their violent behavior but also their background characteristics. To refine our identification strategy further, we examine the stability of the δ estimates by incorporating the average individual characteristics of each new group of violent peers.

4.2 Identification of Underlying Mechanisms

The parameter δ captures the effects of violent peers, which can operate through various channels. One set of channels involves mechanisms within the classroom. For example, it impacts the classroom environment, the quality of student interactions, and the dynamics between students and teachers. Violence can also affect students' motivation, discipline, and

[8] In fact, the correlation between these two measures is 0.47 in the sample of secular schools.

study efforts. Following Lavy and Schlosser (2011), we investigate these mechanisms by estimating models similar to Model 1, using dependent variables derived from students' responses to a school questionnaire. This questionnaire addresses aspects of the classroom environment, student behavior, and study efforts.

A thorough analysis should account for the possibility that these channels may operate concurrently. For instance, a higher proportion of new violent classmates might deteriorate the classroom climate through disruptive behavior, which in turn could damage social relationships within the class. Additionally, violent peers could increase homework to counteract disruptions and lost classroom instructional time, potentially affecting individual student behavior and investment in academic activities.

We use two types of questions in the student questionnaire to differentiate between these mechanisms. One set assesses students' perceptions of general classroom conditions, such as the prevalence of violence and disruption. The effect of exposure to violence on these metrics captures the overall impact of violent peers, including both changes in classroom composition and alterations in student behavior. The other set focuses on students' conduct, including questions about their participation in violent interactions during the current year. An observed effect of violence on these self-reported behaviors would indicate changes in individual behavior. Further details about these questions are provided in Section 7.

4.3 Evidence on the Validity of the Identification Strategy

We first perform a series of balancing tests to evaluate whether fluctuations in the proportion of new violent peers within the same transition path are associated with changes in student background characteristics. Table 2 presents the estimated coefficients from regressions of each background characteristic on the proportion of new violent peers, using four different specifications: OLS regressions without controls, with middle school fixed effects, with primary school cohort fixed effects, and transition path fixed effects.

The naïve OLS results in Column 1 indicate that exposure to new violent peers is correlated with several student background characteristics: negative with parents' years of schooling, positive with the number of siblings, migration status, and ethnicity. Including middle school fixed effects (Column 2) slightly reduces these correlations, although they remain statistically

significant. Including primary school cohort fixed effects (Column 3) diminishes most of these associations, making them statistically insignificant. Finally, introducing transition path fixed effects from primary to middle school (Column 4) removes the significance of all these correlations.

To further ensure that these findings are not due to random chance, we test whether the joint effects of all background characteristics are statistically significant. Specifically, we regress the proportion of new violent peers on the eleven individual characteristics and report, in the bottom row of each column, the respective p-value for the hypothesis that all estimated coefficients are jointly null. The results in the bottom row of Table 3 show that after controlling for primary school cohort fixed effects and/or transition path fixed effects, the estimates become jointly insignificant. Thus, the results suggest no systematic relationship between student characteristics and the proportion of new violent classroom peers. Nevertheless, we include student characteristics in the benchmark regression specification to improve estimation efficiency.

Table A2 presents the results from similar balancing tests, examining the relationship between the proportion of all violent classmates within the same transition path and student background characteristics. The patterns observed in this table are consistent with those in Table 2, suggesting that overall exposure to peer violence is also unrelated to student characteristics within the framework of our empirical strategy.

Even if cohort-to-cohort variations in the proportion of new violent peers within a transition path are purely idiosyncratic, a concern remains that students might react to their exposure to violent peers by changing class or school. However, the lack of school choice at the middle school level and the limited availability of private schooling in Israel significantly mitigate this concern. Nonetheless, to address this concern, we examine the relationship between the proportion of violent peers at the start of middle school (initial exposure) and transfers to a different class within the same school or moving to a new school at the end of seventh grade. We estimate models similar to equation (1), where the dependent variables are dummy indicators of changing class or school, and the explanatory variable is the proportion of new violent classmates at the start of seventh grade. Including the background characteristics of new violent peers in this analysis is particularly relevant, as they may influence mobility

decisions; for example, a student may request a transfer due to the low academic performance or disruptive behavior of their new violent classmates. These estimates are presented in Table A3. Column 1 shows the means of these transitions, and Column 2 the regression estimates.

Approximately 14 percent of students change a class or a school at the end of 7th grade. Four percent moved to a different school, and 10 percent changed classes within the same school. While these mobility rates are noticeable, they are relatively low compared to those in the United States.[9] This makes the identification strategy based on within-transition-path variation in the proportion of new violent peers particularly appealing in the Israeli context. All regression estimates are statistically insignificant, indicating that a student's likelihood of moving to a new class or school is not related to the proportion of new violent peers they face in class at the start of middle school.

5. The Effect of Violent Peers on Academic Achievement

We first present estimates based on class-level averages. This analysis compares the average characteristics of classes within the same school and mitigates the challenge of accounting for unobservable class-specific factors using the within-transition-path variation framework. Additionally, class-level effects provide net measures of the impact of exposure to violence, capturing the dynamics through which these effects operate. Significantly, using class-level averages helps reduce potential measurement error in the treatment variable.

Table 3 reports the effects of the proportion of violent students in a class on the average standardized score (across the four subjects) of the non-violent students in the class. Column 1 presents estimates from a specification controlling only for the proportion of students in the class who reported involvement in violence during primary school. Column 2 adds middle school fixed effects. Columns 3 and 4 further include the average characteristics of non-violent students and violent students in the class, respectively.

Across all columns, the estimates are negative and statistically significant. They decline as we move from columns 1 to 3, but they do not change from then on. The estimate in Column 2 is lower by 23 percent relative to that in Column 1, suggesting that school characteristics are

[9] For example, 21 percent of eighth graders have changed schools at least once (Rumberger 2003).

significant confounding factors. The estimate in column 3 declines further by 27 percent, indicating some selection based on student characteristics within the same school. Adding the average characteristics of violent students in Column 4 makes a small difference, as the estimate remains -1.118 (s.e = 0.274).

Since not all classes include violent students, the result in Column 4 is based on the subsample of classes with a positive proportion of violent students. In Column 5, we present an estimate from a sample that includes classes with zero violent students. This estimate is similar to that of column 4, suggesting that the result in column 4 is robust and not driven by the specific sample of classes with a positive proportion of violent students.

Table 4 presents the estimates of equation (1) with student-level data. Panel A shows the results for the full sample, including students with a zero proportion of new violent peers, whereas panel B presents the results for the sample that includes only students with a positive proportion. The regressions in column 1 include no controls. In columns 2 and 3, we add fixed effects for middle and primary school cohorts. Column 4 adds transition path fixed effects, and column 5 adds controls for student's characteristics. Column 6 adds the proportion of new peers in class, and column 7 also includes the average characteristics of new violent peers.

First, we note that the estimates in column 1 in Tables 3 and 4 are identical. Second, the estimates in Table 4 decline as we add controls, as seen in Table 3. For example, focusing on the estimates in panel B, adding middle school fixed effects in column 2 reduces the estimate by one-third. Adding primary school cohort fixed effects in column 3 further reduces the estimate by about 28 percent, underscoring the importance of primary school characteristics in shaping future outcomes. Despite these reductions, the estimate remains negative and statistically significant. However, the estimates in columns 4 and 5 are identical to those of column 3, even though we add transition path fixed effects and individual characteristics. The relative stability of the estimate underscores the balance in the characteristics of violent peers. Column 6 further incorporates controls for the proportion of new peers in the class, leading to a small reduction (about 10 percent) in the estimated effect. Finally, column 7 in panel B, which includes the average characteristics of students' new violent peers, represents our preferred specification. This refinement leads to a slight reduction in the magnitude of the estimated effect, which stands at −0.953 (s.e = 0.224).

The estimates in panel A are slightly higher than those in panel B but follow a similar pattern across columns. This consistency suggests that the estimate in column 7 of panel B, under our preferred specification, is robust to sample selection, which is based only on students with non-zero proportions of new violent peers.

To assess the effect size of these estimates, we note that, on average, a student in the sample has three new violent peers out of approximately 32 classmates with a record of violent behavior in primary school. Reclassifying one non-violent new peer as violent (increasing the proportion of new violent peers by roughly three percentage points) leads to a decrease of about 0.03 standard deviations in the student's average score. Although this effect is moderate in absolute terms, it is meaningful compared to related findings in the literature. For example, Kristoffersen et al. (2015) find that the presence of a potentially disruptive student reduces peers' academic achievement by about 0.02 standard deviations. On another effect size scale, a one SD increase (0.06) in the proportion of new violent classmates causes a 0.06 SD decline in average scores. In contrast, Carrell and Hoekstra (2010) report a much lower effect size: a one SD increase in the proportion of students from troubled families results in a decrease of 0.025 SD in test scores. However, note that these are two different treatments; our is the peer's previous violence and bullying records, while the other is whether a peer's family experienced domestic violence.

In Table A4, we estimate similar models but use the proportion of all violent classmates as the explanatory variable. As shown in Table A1, the within-transition-path variation in this proportion is unrelated to students' background characteristics. However, it may be endogenous, as it includes violent peers who were previously classmates. Therefore, it enables us to assess how biased its estimated impact is relative to the exogenous treatment variable based on new violent peers. The estimates in Table A4 show similar patterns to those in Table 4, though they are slightly smaller in magnitude, −0.863 (column 6) versus −0.978. Though the difference between these two estimates is not statistically significant, it may suggest that the endogeneity of this treatment measure leads to a downward bias in the effect of classroom violence on learning outcomes.

5.1 Robustness of Main Findings

In this subsection, we present additional evidence supporting the robustness of the results in Table 4. First, as mentioned above, the class-level estimation (Table 3) addresses the challenge of accounting for unobservable class-specific factors and provides a net measure of the effect of violence. The fact that the estimates in Table 4, mainly when using our preferred specification in column 7, closely align with those based on the class averages sample supports the robustness of these results.

Table 5 reports results based on a sample of students with a positive proportion of new violent peers, but only those who participated in the primary school survey, answering the item on their violence. Based on our preferred specification, the estimate is -0.872, which is not too different from the benchmark estimate, −0.953 (column 7 in Table 4).

Columns 2-4 show that the results are robust when constructing the sample based on the completeness of the class information. Specifically, the results for classes with at least 70, 80, and 90 percent of class information remain similar to the benchmark estimate.

Placebo Regressions: Columns 5-6 in Table 5 present the estimates from two falsification regressions intended to validate the causal interpretation of the results in Table 4. These placebo tests involve randomizing the proportion of new violent peers and the overall proportion of new peers. In column 5, the randomization occurs across all students within the same middle school, while in column 6, it is within the same transition path. If the results in Table 4 were due to unobserved factors correlated with the actual proportion of new violent peers, we would expect that exposure to new violent peers in different classes within the same middle school or transition path would also affect student achievement. Both estimates from the placebo tests are insignificant, notably different, and much smaller than those obtained with the actual treatment. The estimate from the within-middle-school randomization is even positive (0.118). These results provide compelling evidence that the main findings are not driven by spurious correlations between the proportion of new violent peers and other factors that vary across primary and middle schools or within students on the same transition path.

5.2 Heterogeneous Treatment Effects

To gain further insights into the effect of violent peers, we explore how the impact of the proportion of violent peers varies across different dimensions. We first present in Table 6

evidence of heterogeneity by study subjects, student's socio-economic status, and gender. Each row in the table presents estimates of the effect on the average standardized score and the scores in each subject separately.

Column 1 shows the results for the full sample. All the estimates are negative and statistically significant. However, there is variation in the effect across subjects: The effects in Hebrew and science (−0.604 and −0.657, respectively) are 40-50 percent lower than in mathematics and English (−1.078 and −1.150, respectively). The effect on test scores in Math and English is higher than in the other two subjects, but we cannot reject that they are statistically the same. The larger effects in math and English can reflect that it is more difficult for students to learn independently the material not covered in class due to lost time of instruction due to disruptive classroom behavior.

Results by Parental Education: In columns 2 and 3, we compare the results for low and high-socioeconomic-status students. Specifically, the analysis is based on two subsamples stratified by the average years of schooling of both parents: below the median (12 years) and above the median. The effects on average scores are similar across both groups. However, there are distinct patterns when examining the results by subject. The effects on Hebrew scores are similar for both groups but statistically significant only for students with lower parental education. The effect on science scores is statistically significant for students with lower parental education and is approximately twice as large as that for students with higher parental education. In contrast, the results for mathematics and English deviate from expectations. Since proficiency in these subjects is typically associated with higher parental education, one might expect that parents with higher levels of schooling would better mitigate the adverse effects of violence on classroom learning and the school environment. Contrary to this expectation, the effects in mathematics and English are statistically significant, negative, and similar across both subsamples. It seems that higher parental education does buffer the impact of classroom violence.

The estimates by parental education, especially for math and English, are also important because they are evidence that our results are not driven or confounded by tracking practices. We observe tracking in some schools but only in math and English. Students tracked into

higher-level classes are, on average, from a high level of parental education. Yet, we do find a large negative effect of classroom violence in this sample.

Results by Gender: In columns 4 and 5, we report stratified results by gender. The estimated effect on the average score for girls is approximately 45 percent larger than for boys (-1.202 vs. -0.827). While the effects are higher for both genders in mathematics and English, the impact is consistently larger and statistically significant for girls. For instance, the estimate for Hebrew is −0.885 (s.e=0.336) for girls, compared to −0.145 (s.e=0.388) for boys. These gender differences are particularly noteworthy, given that students are placed in mixed-sex classes. This suggests that the negative impact of violent peers is more pronounced for girls.

Results by Gender of the Violent Peer: One factor that is not uniform across all students in the classroom is the gender dynamics within peer relationships. During early to mid-adolescence, peer networks tend to be predominantly same-sex (Sippola, 1999). Table 7 presents the estimated effects of new violent boy and girl peers for the entire sample and for subsamples of boys and girls. For the full sample, both estimates are negative and of similar magnitude, but only the effect of violent boys is statistically significant.

Moving to estimate the treatment effect by the gender of the violent peer, boys are negatively affected by the presence of other violent boys (−1.024, s.e=0.445) but not by violent girls (−0.140, s.e=0.919). In contrast, while girls are similarly affected by violent boys (−0.981, s.e=0.392), they are more than twice as negatively impacted by the presence of other violent girls (−2.108, s.e=1.132), despite boys constituting the majority of the violent peers. However, the p-values reported at the bottom of the table indicate that we cannot conclude that the effects of violence differ significantly based on the gender of the violent peers. The difference in effect size is also less dramatic because the mean proportion of violent girls is much smaller than that of boys.

Results by Intensity of Peer Violence: Another source of possible heterogeneity is the levels of violence among peers. Table A5 presents results, focusing on two key intensity dimensions: (a) the levels of involvement in violence of violent peers and (b) the source of their violence, specifically whether they are "pure violent" peers or "violent-victim" peers. Panel A presents estimates based on variations in the level of peer violence. We grouped the "somewhat agree" and "agree" categories while estimating the effect of the proportion of "strongly agree" peers

separately. The results fail to support a monotonic effect, as the estimated effect for the "somewhat agree/agree" category is similar to that of the "strongly agree" category.

Panel B compares the effects of pure violent peers to the effects of violent-victim peers (students who were involved in violence but also experienced bullying or intimidation by other violent students). Note that the levels of involvement in fights during primary school are similar across the two groups, so the estimates in this panel capture the sole effect of the source of violence.[10] Consistent with findings in the medical literature discussed in Section 4, the estimated effect of violent-victim peers is more pronounced than that of pure-victim peers. However, based on the standard errors of these two estimates, we cannot reject that the two effects are identical statistically.

6. Mediation Analysis of Violence Peer Effects

In this section, we use the GEMS middle school survey data to gain further insights into the nature of these violent peer effects. Specifically, we explore potential mechanisms through which these peer effects may operate, including changes in the student's violent behavior, student study efforts and parental investment, classroom and school learning environment, and teachers' fatigue and work satisfaction.

6.1 Classroom and School Environment

Several items from the student questionnaire describe the classroom and school environment. We use the following seven items because they are most related to the learning environment: *the classroom is frequently noisy and non-conducive for learning, there are many fights among students in my class, students are frequently rude to teachers, there are good relationships between teachers and the students, there is mutual respect between the teachers and the students, students in my class help each other, sometimes I am scared to go to school because there are violent students*. We estimate the effect of violent peers on each item and their average, following Kling et al. (2007) to average

[10] The distributions of responses are as follows: among the pure violent students, 47 percent responded with "somewhat agree," 29 percent with "agree," and 23 percent with "strongly agree." For the violent-victim students, 35 percent responded with "somewhat agree," 29 percent with "agree," and 36 percent with "strongly agree."

the standardized effects on the individual outcomes into one index.[11] We then estimate a system of regressions for seemingly unrelated categories. Given the absence of prior information to justify differential weighting, we assign equal weight to each item. Since the dependent variables in these regressions are standardized, the coefficients represent the effect of a one-unit change in the variable of interest on the dependent variable, measured in standard deviation units.

Online appendix Table A6 shows that these seven indicators of classroom environment are highly associated with students' academic performance, even after controlling for primary and middle school fixed effects, transition path fixed effects, and students' background characteristics. Specifically, improvements in the classroom environment, characterized by greater discipline and reduced violence, better student-teacher relationships, and more positive inter-student relationships, is positively correlated with better academic performance.

However, these correlations do not allow for a causal interpretation, as other factors may influence both the observed mechanisms and test scores, or there may be reverse causation. Nevertheless, as noted by Lavy and Schlosser (2011) and Lavy et al. (2012a), who used a similar mediation analysis with these questionnaire items, the results presented in Table A6 suggest that students' assessments of their classroom environment contain valuable information. These assessments highlight mechanisms that may significantly impact academic achievement, as identified in the educational literature. While the analysis cannot capture all relevant mechanisms or rule out other factors, it provides essential insights into potential mediators of the negative impact of violence on students' academic performance.

Table 8 presents the regression estimates of the seven outcomes and their average. The estimates are from a regression using the preferred specification. Again, we present results from the entire sample and by parental education and gender. The evidence from the entire sample shows that violent peers negatively affect all seven class-level environment outcomes,

[11] Specifically,wedefine the average effect τ_c of the proportion of new violent peers for category c as: $\tau_c = \frac{1}{K_c}\sum_{k=1}^{K_c}\frac{\pi_{kc}}{\sigma_{kc}}$, where K_c is the number of outcomes included in category c, π_{kc} represents the effect on outcome k included in category c. The standard deviation of the outcome, σ_{kc},wetreat σ_{kc} is treated as known, based on the methodologies of Lavy and Schlosser (2011) and Lavy, Paserman, and Schlosser (2012), as well as the large sample size available.

and all but one are statistically significant. However, the estimates by gender show that girls are more negatively affected. All estimates for girls are negative and statistically significant across all items, while the estimates for boys are generally smaller and statistically insignificant. Specifically, girls report worse classroom discipline and higher levels of peer violence as the proportion of violent peers increases and poorer student-teacher and intra-student relationships.

These findings are consistent with established psychological literature suggesting that girls demonstrate greater social awareness and sensitivity from an early age, a trait that persists throughout development (Brody, 1985; McClure, 2000; Zahn-Waxler et al., 2015). This increased sensitivity may be reflected in girls' more pronounced perceptions of the classroom environment, particularly in contrast to the relative non-responsiveness of boys. Such heightened awareness of classroom misbehavior and the dynamics of peer and teacher relationships may help explain why girls report more severe negative effects in classrooms with a higher proportion of violent peers.

6.2 Student Violent Behavior

We first examine whether violent peers cause other students to be involved as well in violent behaviors, specifically physical altercations. To this end, we analyze relevant items from the student survey in middle school. Table 9 presents regression estimates of the proportion of peers with a school violence history. The "Self-behavior" panel of Table 9 presents the results for the effect of exposure to violent peers on the average outcome we note as 'self-discipline and violence' and on an indicator of 'violent behavior in middle school'. The estimates in the first column are positive and statistically significant, indicating that classroom violent peers reduce discipline and increase violent incidence among other students who do not have a record of violence in primary school. The estimates in columns 2-5 show a striking pattern: the estimates in column 1 are driven only by an effect on students from low-educated families and girls. Focusing on the results by gender, the table shows no significant effect for boys, as both estimates are statistically insignificant. Combined with earlier evidence that boys' reports on the classroom environment are relatively insensitive to the proportion of violent peers, this implies that boys' academic outcomes may be more negatively affected by distractions caused by violence rather than by changes in their social environment or self-behavior.

In contrast, the results reveal a more pronounced effect for girls. While the effect on the average outcome of self-behavior is statistically insignificant, the effect on the dummy variable for involvement in violence is positive and statistically significant (0.187, s.e=0.073). To assess the effect size, a 10-percentage point increase in the proportion of violent peers (roughly doubling the average proportion) results in an increase of approximately two percentage points in the likelihood of a girl engaging in violent behavior. This effect is particularly notable, given that only about 3 percent of girls in the sample report engaging in violent behavior, compared to 15 percent of boys. Assuming a linear relationship, this increase in the proportion of violent peers corresponds to a 67 percent increase in the probability that a girl will engage in violent behavior. These findings suggest that, for girls, exposure to violent peers not only deteriorates the classroom environment but also may contribute to behavioral changes that further exacerbate the negative impact on academic outcomes.

6.3 Student Study Efforts and Parental Investment

Exposure to violence in the classroom can also decrease motivation, leading to lower study effort. An insightful measure of study effort is how much time students spend doing homework. The student questionnaire includes an item about the weekly time the student dedicates to homework in four subjects: Hebrew, science, mathematics, and English. Students choose from the following options for weekly homework hours: zero, one, two, three, four, five, or more. The distributions of the reported homework hours are presented in Figure A1, showing that students invest more time in homework in mathematics and English than in Hebrew and science.

Panel B of Table 9 presents the effects of the proportion of violent peers on the total weekly hours spent on homework in all four subjects. Students spend 9.6 hours per week doing homework. Children with lower parental education spend about 0.6 hours less, and girls spend about 0.7 hours more than boys. The average effect of violent peers on homework time is negative but small and not statistically significant. However, this null effect disguises substantial heterogeneity by socio-economic background and gender. Classroom violence reduces homework time for children from lower-education families and girls. However, although these effects are statistically significant, they are of small magnitude. For instance, a one standard deviation increase in the proportion of violent peers (equivalent to a 0.06

increase) corresponds to a reduction of about 6 minutes in mathematics homework and 11 minutes in total homework for girls.

Estimating these relationships by subject yields a significant adverse effect on the math homework of students from less educated families and girls. We also note that the estimated effect in the sample of high-education families is positive in all subjects, but only the estimate for English homework time is statistically significant.

Another potential mechanism is the effect of peer violence on parental investments in their child's education. We measure such investment by private tutoring lessons parents provide their children. Parents can adjust such investments to mitigate the effects of violence on their children's academic performance. The student survey provides information about private tutoring by subject (Hebrew, science, mathematics, and English). Approximately 40 percent of students in the sample report have private tutorials in at least one subject. Such parental investment is common among lower-education parents, who are only 3 percent less likely to provide private tutoring to their children than their peers from higher-educated families.

The first row in panel C of Table 9 presents estimates where the dependent variable is an indicator that a student receives private tutoring in at least one subject. In the second row, the dependent variable is the number of subjects in which the student receives private tutoring. All ten estimates in panel C are negative; some are large, but none is statistically significant. These findings suggest that parents do not appear to mitigate the effects of violence on their children's academic outcomes by providing additional private tutoring.

6.4 Teachers' Fatigue and Work Satisfaction

In this section, we study the impact of violent students on teachers' motivation and productivity. Specifically, we utilize data from the GEMS teacher questionnaire, which includes three relevant items: "I feel burned out as a teacher," "I feel that I have too much workload," and "I am satisfied with my work at school." The sample comprises 894 teachers from 165 schools. We successfully matched 411 homeroom teachers to their students, although the contact time between homeroom teachers and their students is typically only a few hours per week. The GEMS 2005 dataset also allows matching 562 subject-specific teachers (of

Hebrew, science, mathematics, and English) to their students.[12] Table 10 presents estimates of the effect of the proportion of violent students in a class on teachers' responses to these three items based on our preferred specification.

The mean responses of the full sample of teachers (whether matched to a homeroom class or not) to the statement "I feel burned out" is 2.7 on a Likert scale ranging from 1 to 6. About 25 percent of teachers report agreeing to some extent with this statement, suggesting that a considerable proportion of teachers experience burnout. For the statement "I feel that I have too much workload," the mean response is 4.4, with approximately three-quarters of teachers agreeing with this statement. In contrast, the mean response to "I am satisfied with my work at school" is 5.3, with a low standard deviation of 0.87, reflecting that 96 percent of the teachers express satisfaction with their work.

The estimates in the bottom two rows of Table 10 indicate that the proportion of violent students is positively associated with teachers' sense of burnout in both the homeroom and specialist teacher samples, although the estimates are statistically insignificant. Violence in the class increases teachers' perception of the workload but only of subject-specific teachers. The effect of classroom violence on teachers' job satisfaction is negative but statistically significant only for homeroom teachers. A possible explanation for this pattern is that homeroom teachers have to deal with all disciplinary incidents of their students, including those occurring in lessons with other teachers, and with the broader consequences of violence for their homeroom class's learning and social environment.

The correlations presented in Table 10 align with the effects of violence on the classroom environment, which may act as channels through which violence impacts teachers' well-being. However, it is important to note that the estimates in Table 9 cannot be interpreted as causal due to the potential for confounding factors or reverse causality.

7. Conclusion

[12] Note that 99 percent of the subject-specific teachers report teaching only one subject.

In this paper, we examine the peer effects of violent students on academic achievement using a rich dataset from Israeli schools. The study explores how a violent classroom climate influences student performance, distinguishing between two primary channels: the direct effect on classroom dynamics and the indirect effect through changes in individual student behavior. The findings provide robust evidence that exposure to violent peers in middle school significantly impairs academic outcomes. Specifically, the presence of new violent classmates—those who were not previous primary school peers but have a history of violent behavior—negatively influences performance in core subjects such as Hebrew, mathematics, English, and science. By employing a rigorous empirical strategy that leverages variations across primary and middle schools within the same student transition path, the study mitigates confounding factors such as socio-economic background and innate ability and controls for potential biases from unobserved variables.

The analysis reveals that the impact of violent peers is not uniform across subjects. Students suffer greater declines in achievement in mathematics and English compared to Hebrew and science. Furthermore, the negative effects of exposure to violence are more pronounced for girls than for boys. Specifically, boys' academic performance is significantly affected only by the presence of violent male peers, while girls experience negative outcomes from both violent male and female classmates. This finding is consistent with existing literature on gender-based peer effects, which underscores the importance of classroom composition in shaping academic achievement (e.g., Lavy and Schlosser, 2011; Anelli & Peri, 2019).

The results suggest that the more severe effects on girls' academic outcomes are primarily driven by a deteriorating classroom environment, characterized by heightened perceptions of violence and disruption, as well as weakened relationships between students and between students and teachers. Additionally, the study finds that the impact of exposure to violent peers among girls is also mediated by changes in their behavior, including an increased likelihood of engaging in violent conduct themselves.

The study also documents that violent peers affect student study efforts, mainly for girls and students from low SES backgrounds. In contrast, the analysis provides limited evidence that exposure to violence mediates academic performance through changes in family investment in learning resources such as private tutorial lessons. Furthermore, the study presents some

evidence suggesting that the drawbacks of exposure to violence may be attributed to higher teacher workloads and lower job satisfaction, which likely affect teacher productivity and, in turn, students' academic achievement.

From a policy perspective, these findings highlight the importance of interventions aimed at reducing school violence to improve academic outcomes, particularly for girls, who appear more vulnerable to the negative consequences of peer violence. The results also underscore the need for gender-sensitive approaches in addressing school violence, given the differing effects and mechanisms at play between boys and girls, especially in co-educational settings.

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Table 1: Descriptive Statistics of Exposure to New Classmates and Violence

	Mean	St. Dev.	Min	Max
Proportion of students reporting the level violent behavior in elementary school	0.90	0.03	0.85	1.00
Proportion of new peers in class	0.76	0.16	0.03	1.00
Exposure to Violence				
Proportion of violent peers in class	0.14	0.07	0.03	0.52
Proportion of new violent peers in class	0.11	0.06	0.03	0.52
Proportion of old violent peers in class	0.03	0.04	0.00	0.25
New Exposure to Violence				
Levels of agreement:				
Somewhat agree	0.05	0.04	0.00	0.28
Agree	0.03	0.03	0.00	0.24
Strongly agree	0.03	0.03	0.00	0.17
Source of violence:				
Proportion of pure violent	0.08	0.05	0.00	0.44
Proportion of violent-victim	0.02	0.03	0.00	0.20
Gender:				
Boys	0.08	0.05	0.00	0.33
Girls	0.02	0.03	0.00	0.24

Notes: The table provides means, standard deviations, and minimum and maximum values for various proportions related to classroom dynamics and violence. The proportion of students reporting the level of violent behavior during elementary school is calculated at the class level. All other proportions are calculated at the student level.

Table 2: Balancing Tests for the Proportion of New Violent Peers

	(1)	(2)	(3)	(4)
Boy	-0.039	-0.168	-0.148	-0.064
	(0.083)	(0.104)	(0.131)	(0.125)
Father's years of schooling	-4.447***	-1.096**	-0.101	-0.041
	(0.702)	(0.552)	(0.519)	(0.558)
Mother's years of schooling	-4.519***	-0.812*	-0.011	-0.260
	(0.594)	(0.466)	(0.494)	(0.591)
Number of siblings	0.552**	0.437**	0.319	0.258
	(0.221)	(0.190)	(0.211)	(0.222)
New immigrant	0.062***	0.041**	0.015	0.019
	(0.016)	(0.018)	(0.021)	(0.022)
Ethnic origin				
Israel	-0.485***	-0.219**	-0.147	-0.075
	(0.096)	(0.087)	(0.100)	(0.103)
Europe, the Americas or Oceania (excluding FSU)	-0.285***	-0.161***	-0.107	-0.086
	(0.051)	(0.055)	(0.068)	(0.068)
Asia or Africa (excluding Ethiopia)	0.326***	0.150**	0.068	0.085
	(0.063)	(0.071)	(0.087)	(0.094)
Ethiopia	0.124***	0.086***	0.043*	0.020
	(0.025)	(0.026)	(0.025)	(0.029)
Former Soviet Union (FSU)	0.360***	0.144*	0.158**	0.078
	(0.074)	(0.074)	(0.079)	(0.087)
Other	-0.041	0.000	-0.015	-0.022
	(0.025)	(0.026)	(0.033)	(0.032)
Joint significance *p-value*	0.000	0.000	0.228	0.877
Middle school FE		✓	✓	✓
Elementary school cohort FE			✓	✓
Transition path FE				✓
Number of students	15,941			

Notes: The table presents estimates from separate regressions where the dependent variable is a relevant student characteristic, and the independent variable is the proportion of new violent classmates. In Column 1, the regressions do not include any controls. Column 2 includes fixed effects for middle school, while Column 3 adds fixed effects for the elementary school cohort (the interaction between cohort and elementary school). Column 4 incorporates fixed effects for both elementary and middle school, representing the transition path. The bottom row of the table reports the *p-value* for the null hypothesis that none of the characteristics are jointly associated with the proportion of new violent classmates. This is based on a single regression per column, where the dependent variable is the proportion of new violent classmates and all characteristics are included as explanatory variables. Robust standard errors, clustered at the transition path level, are reported in parentheses. Significance level of regressions are reported as follows: '***' = 1% level, '**' = 5% level and '*' = 10% level.

Table 3: Estimates of the Effects of the Proportion of Violent Students on Average Scores of Non-Violent Students, Sample of Class Means

	(1)	(2)	(3)	(4)	(5)
Proportion of violent students	-2.076***	-1.606***	-1.165***	-1.118***	-1.139***
	(0.289)	(0.312)	(0.264)	(0.274)	(0.274)
Proportion of violence information	✓	✓	✓	✓	✓
Middle school FE		✓	✓	✓	✓
Non-violent mean controls			✓	✓	✓
Violent mean controls				✓	✓
Including classes with zero proportion					✓
Number of classes	546	546	546	535	546

Notes: The table reports estimates of the effect of the proportion of violent students in a class on the average standardized score of non-violent students. In Column 1, the model includes the proportion of students in the class who reported involvement in violence during elementary school. Column 2 adds middle school fixed effects, Column 3 adds class-level average characteristics of non-violent students, and Column 4 the average characteristics of violent students in the class. Column 5 includes an indicator for classes with a zero proportion of violent students. Robust standard errors, clustered at the middle school level, are reported in parentheses. The significance levels of the regression estimates are indicated as follows: '***' = 1% level, '**' = 5% level and '*' = 10% level.

Table 4: Estimates of the Effects of the Proportion of New Violent Peers on Average Scores, Sample of Students

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
A. Full sample							
Proportion of new violent peers	-2.074***	-1.508***	-1.277***	-1.306***	-1.231***	-1.138***	
	(0.183)	(0.163)	(0.200)	(0.219)	(0.197)	(0.202)	
Number of Students	18,530						
B. Students with a positive proportion							
Proportion of new violent peers	-2.098***	-1.400***	-1.089***	-1.124***	-1.089***	-0.978***	-0.953***
	(0.197)	(0.179)	(0.218)	(0.241)	(0.223)	(0.226)	(0.224)
Number of Students	15,941						
Proportion of violence information	✓	✓	✓	✓	✓	✓	✓
Middle school FE		✓	✓	✓	✓	✓	✓
Elementary school cohort FE			✓	✓	✓	✓	✓
Transition path FE				✓	✓	✓	✓
Individual controls					✓	✓	✓
Proportion of new peers						✓	✓
Violent mean controls							✓

Notes: The table reports estimates of the effects of the proportion of new violent peers in a class on students' average standardized test scores. Panel A shows the results for the full sample, including students with a zero proportion, whereas Panel B presents the results for the sample that includes only students with a positive proportion. In Column 1, the model includes only the proportion of students with prior reports of involvement in violence. Column 2 adds fixed effects for middle schools. In Column 3, the model further incorporates fixed effects for elementary school cohorts. Column 4 introduces fixed effects for the transition path between elementary and middle school. Column 5 controls for individual student characteristics. Column 6 includes the proportion of new peers in the class. Finally, in Panel B, Column 7 adds the average characteristics of new violent peers in the class. Robust standard errors, clustered at the transition level, are reported in parentheses. The significance levels of the regression estimates are indicated as follows: '***' = 1% level, '**' = 5% level and '*' = 10% level.

Table 5: Robustness Checks

	Excluding non-respondents	Information in class			Placebo regressions	
		>= 70%	>= 80%	>= 90%	Within middle school	Within transition path
	(1)	(2)	(3)	(4)	(5)	(6)
Proportion of new violent peers	-0.872***	-0.972***	-0.852***	-1.009**	0.118	-0.004
	(0.227)	(0.130)	(0.154)	(0.431)	(0.144)	(0.166)

Notes: The table reports estimates of the effects of the proportion of new violent peers in a class on students' average standardized test scores, under several robustness checks. Column 1 presents the estimated effect for a sample where students who did not respond to the violence-related question used for classification are excluded. Columns 2-4 show the estimated effect for a sample of students in classes where at least 70/80/90 percent of students have information on their violent involvement in elementary school. Columns 5 and 6 report the estimated coefficients from falsification tests that randomize the proportion of new violent peers and the overall proportion of new peers. In Column 3, the randomization is done within the same middle school, while in Column 4, it is done within students who followed the same transition path from elementary school to middle school. Regression estimates are from models that include the control variables specified in Table 4. Robust standard errors, clustered at the transition path level, are reported in parentheses. The significance levels of the regression estimates are indicated as follows: '***' = 1% level, '**' = 5% level and '*' = 10% level.

Table 6: Estimates of the Effects of New Violent Peers on Students' Scores, by Subject, Full Sample and by Parental Education and Gender

		Parental Education		Gender	
	All	Lower (avg. ≤ 12)	Higher	Boys	Girls
	(1)	(2)	(3)	(4)	(5)
Average	-0.953***	-0.957***	-0.856***	-0.827**	-1.202***
	(0.224)	(0.300)	(0.269)	(0.323)	(0.315)
Hebrew	-0.604**	-0.583*	-0.522	-0.145	-0.885***
	(0.243)	(0.324)	(0.336)	(0.388)	(0.336)
Science	-0.657***	-0.744***	-0.397	-0.526	-0.856***
	(0.216)	(0.284)	(0.278)	(0.348)	(0.317)
Mathematics	-1.078***	-1.157***	-0.886***	-1.030***	-1.350***
	(0.239)	(0.326)	(0.297)	(0.351)	(0.344)
English	-1.150***	-1.083***	-1.135***	-0.818**	-1.479***
	(0.231)	(0.328)	(0.282)	(0.336)	(0.330)

Notes: The table reports estimates of the heterogeneous effects of the proportion of new violent peers in a class on students' standardized scores. The estimates are presented for the overall average score as well as for Hebrew, Science, Mathematics, and English (the rows in the table). Column 1 shows the estimates for the entire sample of students. Column 2 presents estimates for students with lower parental education (defined as an average parental education level of 12 years or less). Column 3 shows estimates for students with higher parental education. Columns 4 and 5 report estimates separately for boys and girls. Regression estimates are from models that include the control variables specified in Table 4. Robust standard errors, clustered at the transition path level, are reported in parentheses. The significance levels of the regression estimates are indicated as follows: '***' = 1% level, '**' = 5% level and '*' = 10% level.

Table 7: Estimates of the Gender-Specific Effects of New Violent Peers on Students' Scores by Gender

	All	Boys	Girls
	(1)	(2)	(3)
Proportion of new violent boys	-0.957***	-1.024**	-0.981**
	(0.291)	(0.445)	(0.392)
Proportion of new violent girls	-0.938	-0.140	-2.018*
	(0.677)	(0.919)	(1.132)
p-value for equality of coefficients	0.981	0.45	0.435
Number of Students	15,941	7,934	8,007

Notes: The table reports estimates of the effects of the proportion of new violent boys and girls in a class on students' standardized scores. Column 1 shows the estimates for the entire sample of students, while Columns 2 and 3 report estimates separately for boys and girls. The third row of the table reports the *p-value* for the null hypothesis that the gender-specific effects are equal. Regression estimates are from models that include the control variables specified in Table 4. Robust standard errors, clustered at the transition path level, are reported in parentheses. The significance levels of the regression estimates are indicated as follows: '***' = 1% level, '**' = 5% level and '*' = 10% level.

Table 8: Estimates of the Effects of the Proportion of Violent Peers on the Classroom Environment

		Parental Education		Gender	
	All	Lower (avg. ≤ 12)	Higher	Boys	Girls
1. "The classroom is frequently noisy and non-conducive to learning"	0.391	0.329	0.425	0.688	0.142
	(0.301)	(0.371)	(0.561)	(0.445)	(0.464)
	4.993	*4.986*	*5.002*	*4.928*	*5.057*
2. "There are many fights among students in my class"	1.098***	0.819	1.650**	0.979*	1.177**
	(0.394)	(0.510)	(0.672)	(0.594)	(0.591)
	3.187	*3.172*	*3.207*	*3.218*	*3.158*
3. "Students are frequently rude to teachers"	0.977***	0.683	0.954	1.224**	0.571
	(0.336)	(0.415)	(0.595)	(0.511)	(0.493)
	4.539	*4.562*	*4.509*	*4.46*	*4.615*
4. "There are good relationships between the teachers and the students"	-0.894**	-0.527	-1.648***	-0.813	-0.998**
	(0.354)	(0.477)	(0.593)	(0.535)	(0.498)
	3.573	*3.596*	*3.544*	*3.5*	*3.644*
5. "There is mutual respect between teachers and students"	-0.646*	-0.415	-1.181*	-0.392	-0.563
	(0.361)	(0.503)	(0.613)	(0.534)	(0.502)
	3.558	*3.601*	*3.504*	*3.478*	*3.637*
6. "Students in my class help each other"	-1.398***	-1.135**	-1.804***	-0.806	-2.229***
	(0.413)	(0.544)	(0.649)	(0.663)	(0.571)
	3.907	*3.911*	*3.902*	*3.765*	*4.046*
7. Sometimes, I am afraid to go the school because there are violent students		-0.489	0.709	0.225	-0.097
	(0.288)	(0.406)	(0.502)	(0.511)	(0.372)
	1.6	*1.606*	*1.594*	*1.676*	*1.527*

Notes: The table reports estimates of the effects of the proportion of new violent peers in a class on students' reports about pedagogical practices and the classroom environment in their school. Column 1 shows the estimates for the entire sample of students. Column 2 presents estimates for students with lower parental education (defined as an average parental education

level of 12 years or less). Column 3 shows estimates for students with higher parental education. Columns 4 and 5 report estimates separately for boys and girls. Regression estimates are from models that include the control variables specified in Table 4. Robust standard errors, clustered at the transition level, are reported in parentheses. Means of the dependent variables are reported in italics. The significance levels of the regression estimates are indicated as follows: '***' = 1% level,

Table 9: Estimates of the Effects of the Proportion of New Violent Peers on Study Efforts

		Parental Education		Gender	
	All	Lower (avg. ≤ 12)	Higher	Boys	Girls
	(1)	(2)	(3)	(4)	(5)
A. **Student Behavior**					
Self-discipline and violence	-0.266*	-0.134	-0.498*	-0.168	-0.275
	(0.150)	(0.203)	(0.261)	(0.278)	(0.179)
Violent behavior in middle school	0.169**	0.107	0.235*	0.099	0.187**
	(0.073)	(0.107)	(0.120)	(0.144)	(0.073)
B. **Student Investment**					
Total weekly homework hours	-0.818	-2.904**	1.870	1.461	-2.939*
	(1.083)	(1.419)	(1.925)	(1.917)	(1.630)
	9.59	*9.866*	*9.246*	*9.248*	*9.923*
C. Parental Investment					
One/more subjects private tutorial	-0.112	-0.099	-0.190	-0.069	-0.254
	(0.121)	(0.160)	(0.205)	(0.215)	(0.185)
	0.386	*0.372*	*0.404*	*0.363*	*0.409*
Total subjects of tutorial sessions	-0.305	-0.308	-0.487	-0.266	-0.477
	(0.258)	(0.363)	(0.408)	(0.492)	(0.371)
	0.638	*0.65*	*0.622*	*0.619*	*0.655*

Notes: The table reports estimates of the effects of the proportion of new violent peers in a class on students' study efforts, measured by weekly hours spent on homework and private lessons. Column 1 presents results for the full sample, while Columns 2 and 3 show estimates for students with lower (average parental education ≤ 12 years) and higher parental education. Columns 4 and 5 present results separately for boys and girls. The means of the dependent variables are reported in italics. Regression estimates are from models that include the control variables specified in Table 4. Robust standard errors, clustered at the transition path level, are reported in parentheses. The significance levels of the regression estimates are indicated as follows: '***' = 1% level, '**' = 5% level and '*' = 10% level.

Table 10: Estimates of the Effects of the Proportion of Violent Peers on the Teachers' Fatigue, J obSatisfaction and Homework Requirements

	Number of teachers	Number of schools	I feel burned-out	I feel that I have too much workload	I am satisfied with my work at school	Average effect
	(1)	(2)	(3)	(4)	(5)	(6)
A. Means						
Full Sample	894	165	2.709	4.399	5.273	0.349
			(1.486)	(1.38)	(0.871)	(0.735)
Home classroom teachers	411	163	2.599	4.499	5.382	0.391
			(2.599)	(1.357)	(0.865)	(0.7)
Specialist teachers	562	78	2.719	4.367	5.224	0.335
			(2.719)	(1.395)	(0.891)	(0.748)
B. Effects						
Home classroom teachers			0.786	0.825	-1.731*	-1.038
			(2.131)	(1.809)	(1.001)	(1.008)
Specialist teachers			0.766	2.289*	-1.164	-1.170
			(1.499)	(1.265)	(1.225)	(0.739)

Notes: The table reports estimates of the effects of the proportion of new violent peers in a class on teachers' fatigue and job satisfaction. Panel A displays the means and standard deviations (in parentheses) for the full sample and the subsamples of homeroom and specialist teachers. Panel B presents the results for the sample of homeroom teachers and specialist teachers, respectively. Columns 1 and 2 show the number of teachers and schools, respectively. Columns 3 to 5 report the regression estimates for three teachers' responses to different aspects of their work in school. Column 6 presents the estimates for the effect on the average of the standardized teachers' responses to the three aspects in Columns 3 to 5. The sign of the first two aspects is reversed. Regression estimates are from models that include the control variables specified in Table 4. Robust standard errors, clustered at the transition path level, are reported in parentheses. The significance levels of the regression estimates are indicated as follows: '***' = 1% level, '**' = 5% level and '*' = 10% level.

Appendix

Table A1: Comparison of Characteristics Between Violent and Non-Violent Peers

	Violent	Non-Violent	Difference
	(1)	(2)	(3)
Boy	0.8	0.45	0.35***
	(0.4)	(0.5)	(0.01)
Father's years of schooling	12.2	12.73	-0.54***
	(2.71)	(2.87)	(0.07)
Mother's years of schooling	12.32	12.91	-0.59***
	(2.6)	(2.69)	(0.07)
Number of siblings	2.24	2.15	0.1***
	(1.2)	(1.1)	(0.03)
New immigrant	0.01	0.01	0.01***
	(0.12)	(0.09)	(0)
Ethnic origin			
Israel	0.48	0.5	-0.03**
	(0.5)	(0.5)	(0.01)
Europe, the Americas or Oceania (excluding FSU)	0.11	0.15	-0.04***
	(0.31)	(0.36)	(0.01)
Asia or Africa (excluding Ethiopia)	0.2	0.18	0.02*
	(0.4)	(0.39)	(0.01)
Ethiopia	0.03	0.02	0.01***
	(0.18)	(0.13)	(0)
Former Soviet Union (FSU)	0.15	0.12	0.03***
	(0.36)	(0.32)	(0.01)
Other	0.03	0.03	0
	(0.16)	(0.17)	(0)
Violent student based on middle school reports	0.23	0.07	0.16***
	(0.42)	(0.26)	(0.01)
Number of students	1,510	10,849	

Notes: The table compares the means and standard deviations (in parentheses) of background characteristics and middle school violent behavior between violent and non-violent students, presented in Columns 1 and 2, respectively. The differences between the means are shown in Column 3, with significance levels reported as follows: '***' = 1% level, '**' = 5% level and '*' = 10% level.

Table A2: Balancing Tests for the Proportion of All Violent Peers

	(1)	(2)	(3)	(4)
Boy	0.012	-0.093	-0.032	0.016
	(0.076)	(0.105)	(0.120)	(0.092)
Father's years of schooling	-3.530***	-0.803*	-0.538	-0.443
	(0.585)	(0.415)	(0.433)	(0.466)
Mother's years of schooling	-3.451***	-0.284	-0.192	-0.255
	(0.533)	(0.404)	(0.420)	(0.476)
Number of siblings	0.186	0.052	0.083	0.048
	(0.202)	(0.166)	(0.179)	(0.179)
New immigrant	0.026**	0.012	0.011	0.011
	(0.013)	(0.016)	(0.017)	(0.018)
Ethnic origin				
Israel	-0.197**	-0.085	-0.074	-0.027
	(0.087)	(0.082)	(0.089)	(0.088)
Europe, the Americas or Oceania (excluding FSU)	-0.260***	-0.109**	-0.055	-0.052
	(0.045)	(0.053)	(0.060)	(0.056)
Asia or Africa (excluding Ethiopia)	0.250***	0.096	0.034	0.027
	(0.058)	(0.065)	(0.073)	(0.074)
Ethiopia	0.046**	0.023	0.030	0.015
	(0.020)	(0.024)	(0.021)	(0.025)
Former Soviet Union (FSU)	0.203***	0.092	0.086	0.056
	(0.066)	(0.065)	(0.066)	(0.075)
Other	-0.043**	-0.016	-0.021	-0.020
	(0.021)	(0.024)	(0.029)	(0.028)
Joint significance *p-value*	0.000	0.000	0.758	0.983
Middle school FE		✓	✓	✓
Elementary school cohort FE			✓	✓
Transition path FE				✓

Notes: The table presents estimates from separate regressions where the dependent variable is a relevant student characteristic, and the independent variable is the proportion of all violent classmates. In Column 1, the regressions do not include any controls. Column 2 includes fixed effects for middle school, while Column 3 adds fixed effects for the elementary school cohort (the interaction between cohort and elementary school). Column 4 incorporates fixed effects for both elementary and middle school, representing the transition path. The bottom row of the table reports the *p-value* for the null hypothesis that none of the characteristics are jointly associated with the proportion of new violent classmates. This is based on a single regression per column, where the dependent variable is the proportion of new violent classmates and all characteristics are included as explanatory variables. Robust standard errors, clustered at the transition path level, are reported in parentheses. Significance level of regressions are reported as follows: '***' = 1% level, '**' = 5% level and '*' = 10% level.

Table A3: The Effect of the Proportion New Violent Peers on Student's School Mobility

	Mean outcome	Regression estimate
	(1)	(2)
Transition	0.14	-0.048
	(0.35)	(0.159)
Different School	0.04	0.079
	(0.2)	(0.079)
Different Class Same School	0.1	-0.127
	(0.29)	(0.144)

Notes: The table reports means of the dependent variable (Column 1) and estimates (Column 2) for the effects of the proportion of new violent classmates in seventh grade on a student's transition likelihood in the following year (eighth grade). The first row presents summary statistics for any transition (to a different school or class), the second row for moving to a different school, and the third for moving to a different class within the same school. All regressions include middle school fixed effects, elementary school cohort fixed effects, transition path fixed effects, the proportion of students with previous reports of violence, individual student characteristics, the proportion of new peers in the class, and the average characteristics of new violent peers. Robust standard errors, clustered at the transition path level, are reported in parentheses. The significance levels of the regression estimates are indicated as follows: '***' = 1% level, '**' = 5% level and '*' = 10% level.

Table A4: Estimates of the Effects of the Proportion of All Violent Peers on Average Scores, Sample of Students

	(1)	(2)	(3)	(4)	(5)	(6)
Proportion of violent peers	-1.763***	-1.039***	-0.907***	-0.925***	-0.869***	-0.863***
	(0.179)	(0.187)	(0.210)	(0.225)	(0.209)	(0.208)
Proportion of violence information	✓	✓	✓	✓	✓	✓
Middle school FE		✓	✓	✓	✓	✓
Elementary school cohort FE			✓	✓	✓	✓
Transition path FE				✓	✓	✓
Individual Controls					✓	✓
Proportion of new peers						✓
Number of Students	18,530					

Notes: The table reports estimates of the effects of the proportion of all (old and new) violent peers in a class on students' average standardized test scores, using a sample that includes students with a zero proportion of new violent peers. In Column 1, the model includes only the proportion of students with prior reports of involvement in violence. Column 2 adds fixed effects for middle schools. In Column 3, the model further incorporates fixed effects for elementary school cohorts. Column 4 introduces fixed effects for the transition path between elementary and middle school. Column 5 controls for individual student characteristics. Finally, Column 6 includes the proportion of new peers in the class. Robust standard errors, clustered at the transition level, are reported in parentheses. The significance levels of the regression estimates are indicated as follows: '***' = 1% level, '**' = 5% level and '*' = 10% level.

Table A5: Estimates of the Effects of Degree of Violence of Peers on Average Scores, Sample of Students

	(1)
A. Proportions of new violent peers by the level of agreement	
Somewhat agree/agree	-0.935***
	(0.241)
Strongly agree	-1.007***
	(0.374)
p-value for equality of coefficients	0.852
B. Proportion of new violent peers by source of violence	
Pure violent	-0.874***
	(0.234)
Violent-victim	-1.233**
	(0.488)
p-value for equality of coefficients	0.48

Notes: The table presents estimates of the effects of new exposure to violence on students' standardized scores, categorized by the proportion of new violent peers in the class. Panel A shows results based on students' agreement with the statement, "This year, I was involved in many physical fights," where "Somewhat agree" and "Agree" are grouped together. Panel B reports estimates based on the source of violence: pure violence (violent peers) and victimized violence (violent students who also reported some agreement with the statement, "Sometimes I am scared to go to school because there are violent students"). In each section, the results are derived from a single regression where all treatment variables in the panel are included. The bottom row of each panel reports the p-value for the joint test of the null hypothesis that the effects of all proportions within the panel are equal. Regression estimates are from models that include the control variables specified in Table 4. Robust standard errors, clustered at the transition path level, are reported in parentheses. The significance levels of the regression estimates are indicated as follows: '***' = 1% level, '**' = 5% level and '*' = 10% level.

Table A6: Associations Between Average Scores and Teacher's Pedagogical Practices and Classroom Environment, Sample of Students

	Indicators included separately	Indicators included jointly
	(1)	(2)
Classroom environment		
Violence and discipline	0.007	-0.033**
	(0.013)	(0.014)
Student–teacher relationships	0.051***	0.052***
	(0.012)	(0.016)
Inter-student relationships	0.042***	0.029**
	(0.011)	(0.013)
Average effect	0.059***	
	(0.015)	

Notes: The table reports within-transition-path associations between each of the aggregate categories of mechanisms and students' average scores in Hebrew, science, mathematics, and English. All regressions include middle school fixed effects, elementary school cohort fixed effects, transition path fixed effects, and individual student characteristics. Robust standard errors, clustered at the transition level, are reported in parentheses. The significance levels of the regression estimates are indicated as follows: '***' = 1% level, '**' = 5% level and '*' = 10% level.

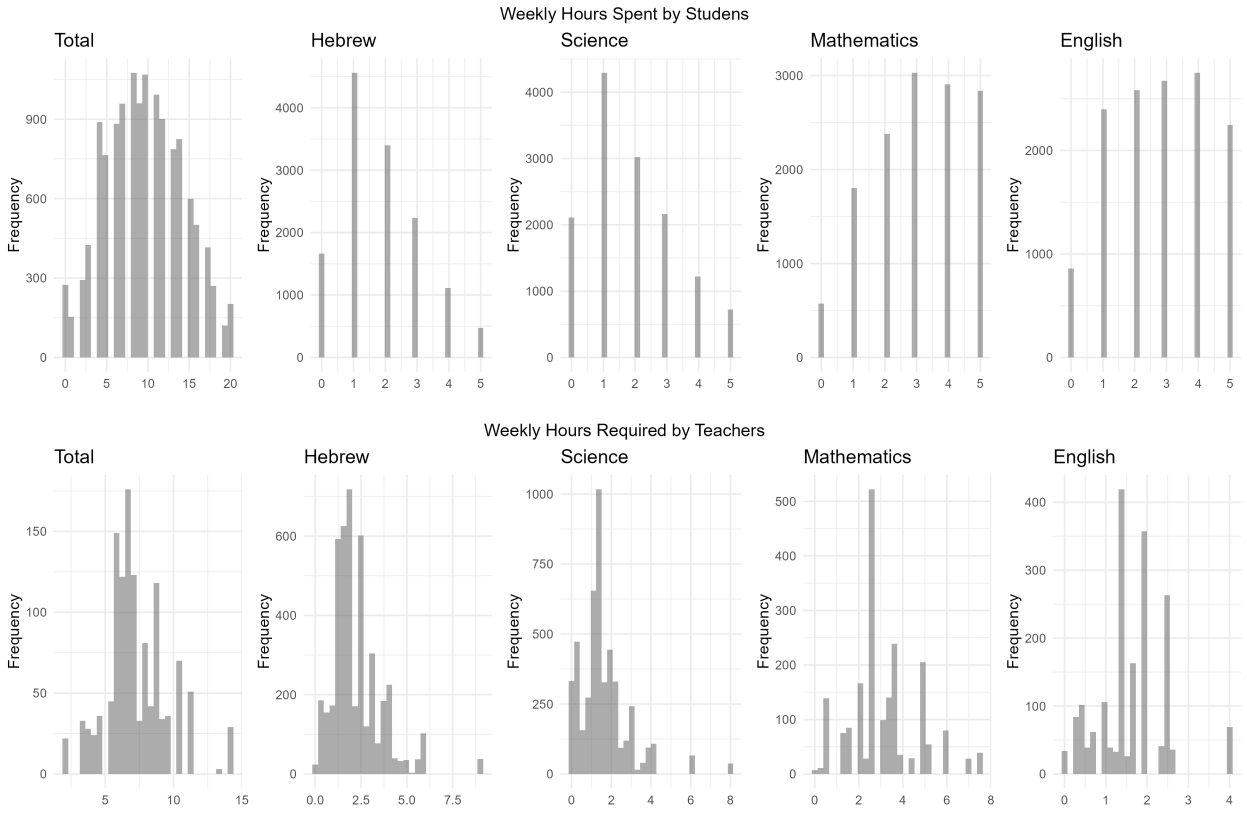


Figure A1: Distribution of Weekly Homework Hours by Subject, Students and Teachers Reports

Notes: The figure shows the distribution of hours students report spending on homework each week in English, Hebrew, Mathematics, Science, as well as the total hours, alongside the respective homework time required by their teachers. The students' hours are derived from their reports on the time they spend doing homework in each subject: 0/1/2/3/4/5+ hours per week. Note that the last category, "5 hours," refers to students reporting they spend 5 or more hours per week on homework. The teachers' hours are based on their reports: the homework minutes they require for a 45-minute class session, multiplied by the number of 45-minute sessions they report teaching the class.